A critical appraisal of "Comparison of the effect of pre- and post-operative physical therapy versus post-operative physical therapy alone on pain and recovery of function after total knee arthroplasty"

By

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Abstract

The aim of this appraisal is to examine the strengths and weaknesses of the research presented by the researchers of King Saud University. The intervention being assessed by the researchers is pre-operative physical therapy in addition to post-operative physical therapy versus post-operative physical therapy alone and the impact on recovery of function. This appraisal will detail the strengths and weaknesses of the study's introduction, methods, results, and discussion. The implication of the critique of this research is to provide an insight into the clinical question I am presenting: does pre-operative physical therapy in patients undergoing total knee replacements provide better range of motion outcomes.

Key words

Total knee arthroplasty, pain, recovery of function, pre- and post-operative

Introduction

With the incidence of total knee arthroplasty increasing, an effective physical therapy strategy is crucial for a optimized recovery of function and reduction of pain. The target population is patients undergoing total knee arthroplasty and the examined intervention is pre- and post- operative physical therapy in comparison with post-operative physical therapy alone. The goal of this intervention is to demonstrate an improved recovery of function and reduced perception of pain. This article provides the background research for the clinical question

presented: does pre-operative physical therapy in patients undergoing total knee replacements provide better range of motion outcomes.

Methods

The literature search process began in the U.S. National Library of Medicine: PubMed, with a search of "physical therapy before knee replacement" and "pre-operative physical therapy knee arthroplasty" elicited a total of 1021 results. Limitations for full text and articles within the past 10 years provided more tailored search results. The inclusion criteria included patient populations undergoing total knee arthroplasty, and intervention of pre-operative physical therapy, and focused on improved range of motion outcomes. This narrowed search resulted in 23 articles.

Researchers Ahmad Alghadir, MS, PhD, PT, Zaheen Ahmed Iqbal, MPT, and Shahnawaz Anwer, MPT of the College of Applied Medical Sciences at King Saud University in Riyadh, Saudi Arabia presented this research to the Journal of Physical Therapy Science in 2016. This article was chosen for critical appraisal because it presented a clear comparison of the traditional treatment plan for total knee arthroplasty, post-operative PT, and a newer intervention, pre and post-operative PT. The methodology of the experiment was an objective, efficient approach to answering the clinical question, and groups were randomly assigned with raters blinded. An extended timeline further added to the credibility of the research. Patients were seen over a time frame long enough to see clinical progress, rather than condensing the timeline down to fit the researcher's schedule.

Results

Summary of the study

The goal of this study was to compare the effects of pre and post-surgical physical therapy to post-surgical physical therapy alone as a means of treating patients undergoing total knee arthroplasty. Specifically, this study focused on the treatment of pain and recovery of function. 50 patients, 18 men and 32 women between the ages of 48-80 years old, participated in a 6 week two-arm randomized trial with the raters blinded. Half of the group received physical therapy before and after surgery, and the other received treatment only after surgery. Progress was measured via a visual analogue scale and a lower extremity functional scale (LEFS) with comparison to a baseline at 3 and 6 weeks post-op. The researchers found that differences in pain and functionality between the two groups was statistically insignificant, and therefore concluded that there was no significant improvement in pain management or recovery of function as a result of pre and post-operative physical therapy.

Appraisal of the study introduction

The introduction presented adequate background on pre- and post-op physical therapy. It also discussed the previous research that has been done about pre/post-op PT and showed the gap in research that researchers were trying to fill. The journals cited are well established and have multiple editions under their belt.

The weakness of the introduction was the citing of a few systematic reviews (1 and 2) referenced, but they make up a small minority of the articles cited. There are a few resources (31 and 32) that are from the same author (Alghadir), which may introduce bias. Researchers did mention that there were limited, if any resources regarding the effects of pre- and post-op vs post-op alone, so it makes sense to see limited sources about that facet of their research.

Appraisal of the study methods

The methodology of the research is a strength of the research. In this prospective study, the experimental research design included single-blinded raters of a two group, between-subjects study. Group assignment was random through the chit box method, subjects were aware of their group due to the fact that they had to participate in the pre/post-op PT. Differences in age and weight were found to be statistically insignificant. All patients were given the same surgery, oral analgesics, post-op care, and TENS administration. The only difference was the administration of pre-op PT in one group. Pain was assessed with the visual analog scale (VAS), and physical functioning was assessed by the Lower extremity functional scale (LEFS). Both of these outcome measures are established as valid.

The weaknesses of the methodology of this research include a limited detailing of the demographics of the groups. There were also more women then men involved in the study, but the distribution between the two groups is unknown. Furthermore, outcome measures were based solely on subjective assessments which introduces bias.

Appraisal of the study results

The results section is clearly presented. Data is reported with statistical significance determined. The results are presented in connection with the research questions; however, that is the extent of the strengths of the results.

While the researchers did present all of the crucial information, the data was presented in an unorganized and unclear way. Only numerical information was presented, and the inclusion of units or reference to the outcome measure used could strengthen the presentation of the data. Further elaboration on the implication of the results could also add to the credibility of the article.

Appraisal of the study discussion

While the final result of the research was inconclusive, the main contribution that this article has to offer is its acknowledgement of limitations and elaboration for future research ideas. The researchers address the lack of previous research on this topic, and establish the need for continuing focus. They also recognize a potential flaw in the methodology by suggesting a lengthened pre-operative physical therapy plan to ensure adequate time to elicit desired result. Researchers also suggest further investigation into pain and function, as well as quadriceps and hamstring muscle strength, knee range of motion, and gait parameters.

The discussion of this article is weakened by lack of significant data to elaborate on. The inconclusive data presented was also minimal, with no meaning given to the numerical information given.

Discussion

This article is clinically significant because joint replacements, let alone total knee arthroplasties, are becoming increasingly more common worldwide. These surgeries, while becoming more commonplace, present significant challenges to both patients and practitioners during the process of recovery. While this article doesn't present a clear-cut answer to the clinical question I am presenting, it does exemplify a positive pathway to a better treatment plan for total knee arthroplasty in the future.

Pre-operative physical therapy as an intervention is still a plausible strategy for improving the recovery from joint replacements. Most knee replacements cases were known conditions that have been dealt with before the decision to surgically intervene. This allows an

opportunity improve the prior level of function before undergoing surgery, and therefore should elicit better recovery outcomes. Further investigation into the length of pre-operative therapy treatment needed to elicit desired results is needed to strength this theory.

Unfortunately, the current applicability of this research into patient care is extremely limited. Further research is needed to establish a stronger foundational support before implementing this theory. In the future, provided adequate research be validated, this intervention would be an easy therapeutic treatment to integrate into a clinical setting.

While this article presents little concrete evidence of the use of the tested intervention, it does open up a gap in current research that is necessary to fill. It suggests further improvements that can be made to their methodology as well as further investigative routes that should be followed to answer the efficacy of pre-operative therapy as an intervention. Furthermore, this research provides an initial insight into the clinical question that I am presenting.